

WHAT IS CLAIMED IS:

1. A sample-cell sequencer for an NMR apparatus including a vertical-bore NMR magnet and an RF probe coil, comprising

5 a guide internally coaxial with said bore for maintaining a stable stack of said sample cells, one said cell occupying a measurement space radially surrounded by said RF probe coil, a base disposed below said bore for supporting said stack, a sample-cell removing device for displacing a sample cell resting upon said base from the position thereof at the lowest position of said stack, whereby remaining said sample cells fall vertically and another sample cell occupies said measurement space.

10 2. The sample-cell sequencer of claim 1 wherein said guide conducts a gas of selected temperature upwardly through said guide whereby said stack is maintained at a desired temperature.

15 3. The sample-cell sequencer of claim 1 further comprising a bar code reader for identifying each sample cell.

20 4. The sample-cell sequencer of claim 1 wherein said base supports a lowest sample cell in turn supporting said stack and a motor for causing displacement of said lowest sample cell from its position whereby the remainder of said cells of said stack descend.

25 5. The sample-cell sequencer of claim 4 wherein said base further comprises a horizontally rotating paddlewheel having vanes of sufficient angular separation to encompass said lowest sample cell, and said motor comprises a stepper motor coupled to said paddlewheel whereby rotation of said paddlewheel by a selected angular increment displaces said lowest sample cell and said queue of sample cells descends by one said cell.

30 6. The sample-cell sequencer of claim 1 wherein a heating device is disposed within said bore at an axial displacement from said measurement space whereby a sample cell is heated prior to occupying said sample space.

7. The sample cell sequencer of claim 6 wherein said heating device comprises an RF coil for heating a sample cell proximate thereto by induction coupling.

8. The method of sequencing a queue of sample cells, each said cells of identical axial extent, for analysis in a vertical axial bore NMR spectrometer having an analytic RF coil, comprising the steps of:

aligning and confining said queue of samples within said bore;

5 disposing said queue to radially align one said sample container with said RF coil while resting a lowest sample cell axially beyond said RF coil;

analyzing one said sample;

causing said lowest sample cell to be displaced from said queue, whereby another sample cell falls into position with respect to said RF coil.

10 9. The method of claim 8 further comprising causing a thermally regulated gas to circulate axially among cells of said queue whereby the sample temperature is maintained at a selected value.

15 10. The method of claim 8 wherein said step of aligning and confining further comprises applying heat directly to at least one said cell of said queue

20 11. The method of analyzing one sample and equilibrating at least one additional sample comprising a plurality of discrete samples for NMR analysis at a selected temperature within an NMR apparatus having an axial bore having an entry end and an exit end and a uniform magnetic field along the axis of said bore, comprising the steps of

a) disposing one said sample of said plurality within an analysis space of said axial bore for analysis therein,

b) arranging said plurality within said bore to form a substantially axial sequence,

25 c) controlling the temperature within said bore whereby at least one of said at least one additional samples acquires a temperature approaching said selected temperature,

d) analyzing said one said sample,

e) removing said one said sample from said analysis space, and directing said analyzed sample to the exit of said bore

30 f) advancing said at least one additional sample to said analysis space.

12. The method of claim 11 comprising repetition of steps (c) through (f) for analysis of said plurality of samples.

13. The method of claim 11 wherein step (d) further comprises acquiring a preliminary spectral response for confirming the conditions of said sample for analysis.

14. The method of claim 13 wherein step (d) further comprises ascertaining that any magnetic
5 disturbance from said sample is insubstantial.

15. The method of claim 12 further comprising causing further samples to enter said entry end of said bore.

10 16. The sample-cell sequencer of claim 1 wherein each said sample cell comprises a substantially cylindrical hollow member of plastic.